CHAPTER 4

CHINA'S GREEN ENERGY POLICIES AND EFFORTS TO PROMOTE THE ALTERNATIVE ENERGY SECTOR

SECTION 1: CHINA'S ENVIRONMENTAL AND GREEN ENERGY POLICIES

Introduction

This year, the Commission held two hearings and went on a fact-finding trip to China in order to investigate China's recent adoption of a large number of domestic policies to promote its green energy industry and improve environmental conditions in the country.* This chapter of the Commission's Report will describe the measures that China has adopted to promote clean energy and the implications this has for the United States. The first section of the chapter will focus on overarching domestic policies to improve the environment and to move toward new forms of clean energy, including China's participation in United Nations (UN) climate change negotiations. The second section will focus specifically on Beijing's efforts to promote its wind, solar, and electric vehicle manufacturing sectors and how these efforts compare with U.S. efforts to promote these sectors. This section will incorporate information obtained from a field hearing held in Toledo, Ohio; Commission meetings with officials during a trip to China; and several visits to green energy manufacturing sites in China.

China currently is the world's biggest energy consumer, the largest emitter of carbon dioxide, and home to some of the most polluted cities in the world.† [1] Realizing that its energy use is directly affecting its economy and security, Beijing has taken significant steps to increase the use of green energy in the country. Chinese leaders view the promotion of these policies as a means to curb demand and increase energy security. In addition, Beijing hopes that "going green" can help to mitigate the polluting effects of China's increasing energy use and help to establish a new, internationally competitive green energy industry. As a result, in 2009, China became the top investor in renewable energy, moving the United

* In the following two sections, "green energy and environmental policies" refer to Chinese policies to promote energy sources beyond traditional coal, oil, and natural gas. It also refers to policies to promote energy efficiency and environmental protection. "Renewable energy," a form of green energy, refers to solar, wind, hydropower, and biomass energy.

† In July 2010, the International Energy Agency announced that China overtook the United States to become the biggest energy consumer in the world in 2009. China's National Bureau of Statistics and its National Energy Agency have refuted these statistics, asserting that in 2009, China consumed at least 200 million tons of oil equivalent less than the United States.

States to second place.[2] The specific policies the government has used to improve energy efficiency and reduce harmful pollutants are wide-ranging and have led to significant improvements. Despite noteworthy accomplishments, problems with enforcement and environmental governance, as well as China's incessant energy demand increases, have hampered and will continue to hamper many of the policies that have been enacted.

Chinese Reasons to Promote Green Energy and Environmental Policies

Chinese leaders have announced several reasons why the country should be moving toward using cleaner and more environmentally friendly energy. Not only would China's push for green energy promote energy security, but Chinese leaders also believe this effort can help to prevent politically destabilizing environmental problems while simultaneously building a globally competitive green energy industry.

Energy Security

One of the primary reasons why China wishes to curb its energy demand and promote green energy is to increase its domestic energy security. In April 2010, Premier Wen Jiabao stated, "We must accelerate the development and use of renewable energies to ensure the country's energy security."[3] Since 2000, China has doubled its consumption of energy and, according to the International Energy Agency, "Prospects for further growth are very strong considering the country's low per-capita consumption level and the fact that China is the most populous nation on the planet."[4] This consumption fuels the country's economy and, if this energy were not available, would severely limit the prospects for future gross domestic product (GDP) growth. In a study commissioned by the National Foreign Trade Council, the law firm of Dewey & LeBoeuf LLC noted:

> *China's continued economic growth—and stability—ultimately rests upon the availability of adequate supplies of energy. . . . At present rates of extraction China will run out of domestic sources of petroleum, natural gas, and coal in an estimated 7, 22, and 75 years, respectively.*[5]

China is already a net energy importer. In 2006, it became the world's third-largest net importer of oil, with over 50 percent of its oil coming from overseas. Despite having one of the world's largest coal reserves, in 2009, China became a net importer of coal.*[6] As mentioned in the Commission's 2008 Annual Report, China's reliance on imports makes the country's energy, and thus its economy, vulnerable to supply shocks caused by geopolitical instability, aggression from other countries, or natural disasters.[7] In order to circumvent these problems, China has looked to improve its ability to produce energy domestically and consume its energy more effi-

*In 2009, China imported 126 million metric tons of coal and only exported 22 million tons. This is only a fraction of China's total coal consumption, which reached 1.4 billion tons in 2008.

ciently. Chinese leaders have pointed to green energy, specifically, as a means of enhancing energy security in the country.

Environmental Problems

A second reason why China is moving toward using green energy is to mitigate its many environmental problems. In January 2010, Xie Zhenhua, vice minister of the National Development and Reform Commission, stated, "Developing a low-carbon economy can help China achieve its interest in . . . breaking free from the constraints of China's long history of environmental problems and high pollution."[8] Approximately 70 percent of China's energy consumption is from the use of coal, the most environmentally unfriendly form of energy.*[9] Making matters worse, industry,† which produces large amounts of pollution, accounts for approximately 70 percent of China's final energy consumption.[10]

China's consumption of fossil fuels, especially coal, has made it the world's largest emitter of carbon dioxide, emitting 8.1 billion metric tons in 2009, or 21 percent of the world total. Although China ranks relatively low in terms of carbon dioxide emissions per capita (see figure 1 below), this amount, too, has more than doubled since 1990.‡[11] Environmental experts in the Chinese government assert that greenhouse gas emissions, such as carbon dioxide, are a leading cause of climate change that is affecting China.[12] China's National Climate Change Programme, a body under China's National Development and Reform Commission, has noted that global climate change has the potential to significantly threaten the agriculture and livestock industry, natural ecosystems, water resources, and coastal areas.§[13] Rob Bradley, then director of the International Climate Policy Initiative at the World Resources Institute, testified that "[w]ith large coastal and delta populations, strained fresh water supplies, and a host of other issues facing it, China is rightly concerned about the stresses a hotter planet will place on its society."[14]

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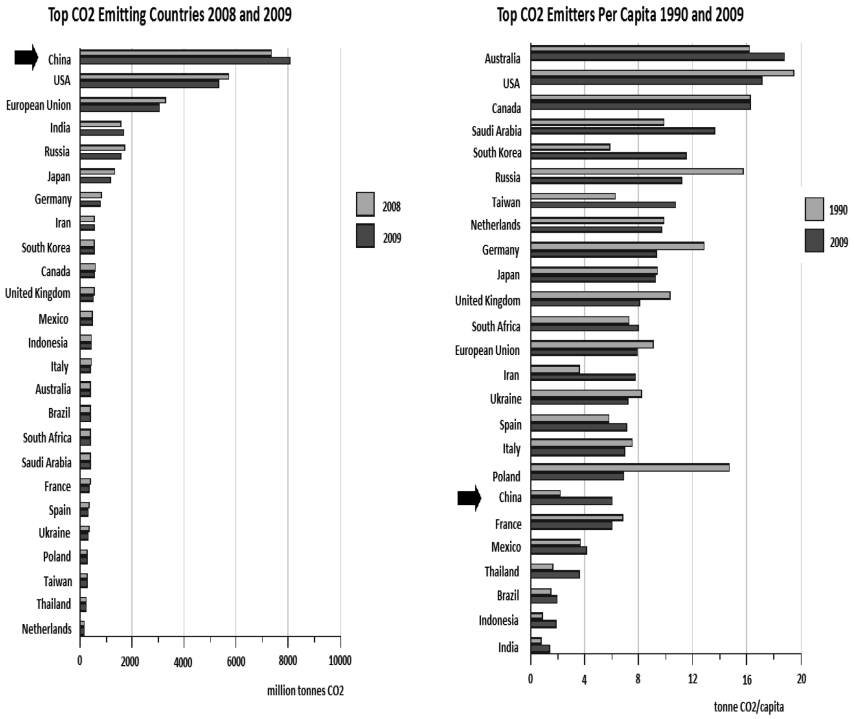
*The combustion of coal adds a more significant amount of carbon dioxide to the earth's atmosphere than the burning of other fossil fuels.

†Industry includes facilities and equipment used for manufacturing, agriculture, mining, and construction. Domestic industry in China lags behind international producers in energy efficiency; Chinese cement, copper, and papermakers use between 45 and 120 percent more energy than do European and U.S. producers.

‡In 2009, China's per capita emissions reached the same level as France.

§For the past 13 years, China has experienced warmer-than-average temperatures, frequent extreme climate events, and accelerated glacier and snow melt as a result of its burgeoning carbon dioxide emissions.

Figure 1: Carbon Dioxide (CO2) Emissions by Country



Source: Chart adapted from J.G.J. Olivier and J.A.H.W. Peters, "No growth in total CO2 emissions in 2009" (Biltoven, Netherlands: Netherlands Environmental Assessment Agency, July 1, 2010), p. 5. *http://www.rivm.nl/bibliotheek/rapporten/500212001.pdf.*

China's amplified energy use and industrialization are also leading to a significant increase in both air and water pollution. In July 2010, China's Ministry of Environmental Protection announced that air quality had worsened in the previous year because of increased construction and industrial growth paid for by the country's economic stimulus program.[15] Jennifer Turner, director of the China Environment Forum at Washington, DC's, Woodrow Wilson Center, testified that the burning of coal and heavy automobile use in cities leads to an estimated 750,000 people dying early per year from respiratory illnesses.[16] Water pollution is also a significant problem. According to China's Ministry of Environmental Protection, one quarter of China's surface water is contaminated, and more than a quarter cannot be used for drinking, swimming, or fishing.[17] Increases in both air and water pollution have a significant effect on the Chinese economy. A 2007 World Bank report estimated that the annual cost of air and water pollution in China is about $112 billion in damages to agriculture and fisheries and in costs of acquiring adequate water for consumption.[18] Chinese air pollution also is having a significant effect on its neighbors, with South Korea and Japan often bearing the brunt of hazardous dust storms that originate in northern China.[19] During the Commission's August 2010 trip to Hong Kong, a professor from Hong Kong

University of Science and Technology noted that 60 to 70 percent of ambient pollution in Hong Kong comes from the Pearl River Delta in the mainland. This pollution also is affecting the United States. In written testimony submitted to the Commission, Assistant Administrator for the U.S. Environmental Protection Agency Michelle DePass stated:

> *We can say with confidence that intercontinental flows of air pollution from Asia have an impact on environmental quality in the United States, possibly affecting the ability of some areas to attain air quality standards and environmental goals.*[20]

Exacerbating everyday pollution is the number of environmental disasters that have taken place in China in recent years. In a recent report, China's Ministry of Environmental Protection announced that environmental accidents had increased by 96 percent in the first six months of 2010.[21] One of these accidents, an acid leak at a copper mine in Fujian Province, killed enough fish to feed 72,000 people for a year.[22] Environmental activists also have blamed landslides in Gansu Province that have led to over 1,700 deaths on unchecked development, such as the cutting down of forests and the building of hydroelectric dams in the region.[23]

Create a Green Industry

A final, but not necessarily less important, reason why China wishes to curb its reliance on energy-intensive sources to fuel its economy is to help foster the growth of the burgeoning green technology sector. According to Bloomberg New Energy Finance and the Pew Charitable Trust:

> *Between 2004 and 2009, clean energy investments (including renewables, efficiency technologies, biofuels, carbon capture and storage, nuclear power, and other low-carbon technologies) grew at an average compound annual growth rate of 39 percent and the wind and solar markets have sustained annual growth rates above 30 percent for the last decade . . . totaling $173 billion in 2008.*[24]

Researchers also note that under a "business-as-usual" case (assuming no changes to existing international climate change policy), cumulative global investments in clean power generation technologies will be $1.58 trillion over the next decade. If aggressive international climate action is taken, the amount of cumulative investment could reach $2.19 trillion.[25] Chinese leaders have announced that they would like to take advantage of the growth of this sector. In September 2009, Premier Wen Jiabao stated, "[China] will accelerate the development of a low-carbon economy and green economy so as to gain an advantageous position in the international industrial competition."[26] China is creating conditions for its domestic green technology companies to flourish at home and in the export market and to attract investments from international companies in China, thereby boosting domestic GDP and creating jobs.[27] In testimony to the Commission, Julian Wong, then senior policy analyst at the Center for American Progress, stated, "Clean energy development is in many ways the 'sweet spot'

industry that fits very nicely with all of [China's] goals of economic reform." These goals include developing domestic science and technology innovation and creating "national champions" that can compete internationally.[28] Section 2 of this chapter discusses China's efforts to promote the wind, solar, and electric vehicle sectors in detail.

China's 11th Five Year Plan (2006–2010)

Realizing the challenges of uncurbed energy demand and environmental degradation, China has taken considerable steps to alleviate these problems. In 2005, Chinese leaders laid out noteworthy targets for reducing pollution and energy consumption in its 11th Five Year Plan for 2006 to 2010.* Two of the most important energy targets in the most recent five year plan are the following:

- *Reduce energy intensity (energy consumption per unit of GDP) by 20 percent by the end of 2010*—In the first four years of the plan, China was on track to achieve this target, having reduced energy intensity by 14.5 percent. However, earlier this year, China's National Bureau of Statistics announced that energy intensity had increased by 0.9 percent in the first half of 2010.† [29] In May 2010, Premier Wen Jiabao stated that he will use an "iron fist" to ensure that the 20 percent target is met by the end of 2010.[30]
- *Reduce major pollutant emissions by 10 percent by the end of 2010*—According to China's Ministry of Environmental Protection, as of the end of 2009, China had reduced its sulfur dioxide emissions (the main cause of air pollution) by 13.14 percent and its chemical oxygen demand (the main measure of water pollution) by 9.66 percent.‡ [31]

In order to achieve the targets laid out in the Five Year Plan, Beijing has enacted a large number of new policies. Much media attention has been focused on China's efforts to promote its renewable energy sector (hydropower, biomass, wind, and solar). However, many of the policies have focused on improving the energy efficiency of existing technology and for planned industrial projects. Mr. Wong testified that the Chinese government supports these efforts because they are more cost-effective and thus will likely command a higher share of investment over renewable energy projects

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* China's five year plans set the direction for economic and social development to be achieved in the next five years.

† China's National Bureau of Statistics reported that in the first quarter of 2010, China had increased energy intensity by 3.5 percent, making it more than 8 percentage points away from reaching its 20 percent reduction goal. However, after the second quarter of 2010, the bureau revised the data so that it is less than five percentage points away from the target. This dramatic change from the first to the second quarter has caused several media analysts to question the reliability of Chinese data. See, for example: Leslie Hook, "China energy use: a sudden revision of the numbers," *Financial Times,* July 26, 2010. *http://blogs.ft.com/beyond-brics/2010/07/16/chinese-energy-use-a-sudden-revision-in-the-numbers/;* Shai Oster, "China Reports Improved Energy Efficiency," *Wall Street Journal,* August 3, 2010. *http://online.wsj.com/article/NA__WSJ__PUB:SB10001424052748704499604575406961858974790.html.*

‡ During its first national pollution source census in 2007, China found that chemical oxygen demand discharge was actually more than twice the levels that were originally thought. Nevertheless, the 11th Five Year Plan targets are still going to be measured against the numbers reported prior to the pollution census. Alex Wang, "Chinese officials talk environmental and climate governance at the National People's Congress Meetings," National Resources Defense Council: GreenLaw, March 17, 2010. *http://www.greenlaw.org.cn/enblog/?p=2320.*

in the future.[32] The following is a list of some of the major projects that have led to China's recent achievements in lowering energy intensity and reducing harmful pollutants:

- *Government support for renewable energy*—China has adopted a number of policies to support its renewable energy sector, including a clean energy standard mandating that 15 percent of China's primary energy come from nonfossil sources by 2020. The Chinese government will focus primarily on wind, solar, and biomass power but will also rely on hydropower to meet this goal.[33] In 2009 alone, $34.6 billion was invested in Chinese companies working in the renewable energy sector, a large portion of which came from Chinese state-owned entities. According to Ethan Zindler of Bloomberg New Energy Finance, "These funds for Chinese firms and projects came from a variety of sources, including Western private equity funds, Chinese development banks, balance sheets of large Chinese state-owned entities, and even small Western investors buying shares of publicly-traded Chinese solar firms."[34] In comparison, the United States attracted $18.6 billion in public and private investment.[35] Because of Chinese government support, China is the largest hydropower generator in the world and has plans to double its hydropower capacity by 2020.*[36] Section 2 of this chapter discusses China's specific programs supporting the renewable energy section.
- *Government support for nuclear energy*—In addition to its renewable energy targets, China has set a goal of building 20 nuclear power plants by 2020, which would increase its nuclear capacity at least fourfold.[37] If achieved, China will account for 57 percent of all new nuclear power plant construction globally between 2007 and 2020.[38]
- *Shutting down of inefficient factories and power plants*—Since 2005, China has shut down almost 7,500 inefficient small power plants and has mandated that all new coal plants must use state-of-the-art technology.[39] Assistant Secretary of Energy for Policy and International Affairs David Sandalow testified to the Commission that because of new regulations, "the average efficiency of [a coal-fired power plant] in China is better than the U.S. average."[40] In addition, in August 2010, China's Ministry of Industry and Information Technology published a list of over 2,000 energy-inefficient steel, iron, cement, and paper factories that will be forced to close by the end of September.†[41] As of the publication of this Report, it is unclear whether the factories were actually closed down.
- *"Top 1,000 Program"*—In 2006, China's National Development Reform Council launched a program to set targets for and monitor improvements in energy efficiency for China's 1,000 largest

*While hydropower is considered a form of renewable energy, several Chinese and western activists have denounced hydropower for its detrimental effects on the environment. They purport that many large-scale dam projects have harmed natural ecosystems and caused severe natural disasters. Large dams in China also have displaced millions of individuals from their homes and land, causing a number of social problems as well. Finally, Chinese hydroelectric dams have raised serious concerns among downstream countries in Southeast Asia and India because of environmental impacts and China's ability to control downstream water flows.

†According to the ministry, if the factories refuse to close, state-owned banks will deny them access to lending, and utility companies will suspend their power.

companies, which account for one third of China's total energy use. At the program's current rate, carbon dioxide emissions will be cumulatively reduced by about 250 million tons by the end of 2010, about 3.6 percent of China's total annual carbon dioxide emissions.[42]

- *"Ten Key Projects"*—In 2005, the Chinese government allocated $1 billion to improve energy efficiency regulations in industry and buildings.[43] The biggest gains from the "Ten Key Projects" have come from renovation of coal-fired industrial boilers, combined heat and power systems* in urban areas, and the building of more energy-efficient residential and commercial spaces.[44]
- *Appliance, electronics, and transportation standards*—In the past five years, the Chinese government has established mandatory energy-efficiency standards that cover most appliances, lighting, and heating equipment. The Center for American Progress, a Washington, DC-based think tank, predicts that these standards will help China to avoid 100 million tons of carbon dioxide emissions per year (1.4 percent of total annual emissions).[45] In addition, China has launched a number of fuel economy standards for passenger cars, many of which are more stringent than those in the United States.[46]
- *Tax and fiscal policies*—China has enacted corporate income tax deductions for companies investing in environmentally friendly projects and equipment. China also has adopted vehicle taxes meant to make energy-intensive vehicles more expensive and reduced export tax rebates for many low value added but high energy-consuming products.[47]
- *Pollution policies*—In 2008, China revised its Water Pollution Control Act, which now requires governments at the county level and above to incorporate water protection into their social and economic development plans, making water protection a major component of local officials' appraisal process.[48] In addition, in May 2010, China's State Council announced that it would be raising air pollution emission standards in several of the most air-polluted provinces in the country.†[49] Dr. Turner testified to the Commission that these "new laws and targets aim, in part, to circumvent powerful local governments, which have long hindered effective implementation of pollution control and energy savings policies."[50]
- *Improving measurement and reporting of energy and environmental statistics*—In 2005, China declared that regional and municipal-level leaders would be responsible for delivering biannual progress reports on energy-intensity reduction. China's National Bureau of Statistics periodically conducts independent verification of the data and punishes and rewards officials accordingly.[51]

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*Combined heat and power systems generate power and thermal energy from a single fuel source.

†The regulations will focus on the Beijing-Tianjin-Hebei region; the Yangtze River Delta region (including Shanghai); the Pearl River Delta region (including Shenzhen and Guangzhou); central Liaoning; the Shandong Peninsula; Wuhan and its surrounding area; the Changsha, Zhuzhou, and Xiangtan region; and the Chengdu and Chongqing region. The standards require each region to impose limits on the expansion of coal-fired power plants and place an emissions cap on harmful emissions.

The 2007 Energy Law also requires large commercial energy users to report energy use to the government, which is used to verify reports from provincial and municipal governments.[52] A 2009 law strengthened penalties for providing inaccurate statistics, with enterprises facing up to a 50,000 renminbi (RMB) (US$7,343) fine.[53] To date, no information is available on what companies, if any, have been charged with violating the law.

Future Policies and Targets

Chinese officials have recently stated that environmental and clean energy policies will continue to be a priority in the immediate future. In November 2009, Premier Wen Jiabao announced that by 2020, China would reduce carbon intensity by 40 to 45 percent from 2005 levels.* Some experts believe that this target would have already been accomplished through China's current domestic policies.[54] Others argue that to succeed, China must spend an additional $30 billion on clean energy and environmental programs every year until 2020.[55] Mr. Bradley testified that "China's commitment is a significant but achievable, step, but it will require China to pursue a suite of policies more sweeping—and more challenging—than its existing energy-efficiency and green energy efforts."[56] It is expected that the target will be included in China's 12th Five Year Plan.[57] Chinese leaders also are discussing a domestic carbon-trading program to be implemented in the near future. According to a participant in a meeting among Chinese energy policymakers, "The consensus that a domestic carbon-trading scheme is essential was reached, but a debate is still ongoing among experts and industries regarding what approach should be adopted."[58] Chinese policymakers currently are discussing whether to put an absolute cap on carbon and in which cities and/or sectors to begin pilot programs.[59]

Challenges to Addressing Environmental and Energy Concerns

While Beijing has passed numerous pieces of legislation addressing environmental concerns, there often has been difficulty in implementing laws and accurately measuring successes or failures. Environmental Protection Agency Assistant Administrator DePass submitted testimony stating:

> *The 'planning culture' in China, a legacy of decades of single-party rule, remains strong, while the rule of law and 'compliance culture' are still evolving. Despite enactment of a range of legislation in recent decades, many provisions in China's environmental statutes have aspirational mandates, unclear enforcement mechanisms, and limited or weak provisions for judicial review or public oversight.*[60]

One of the reasons for these problems is that there are almost 50 central administrative bodies that form energy and environmen-

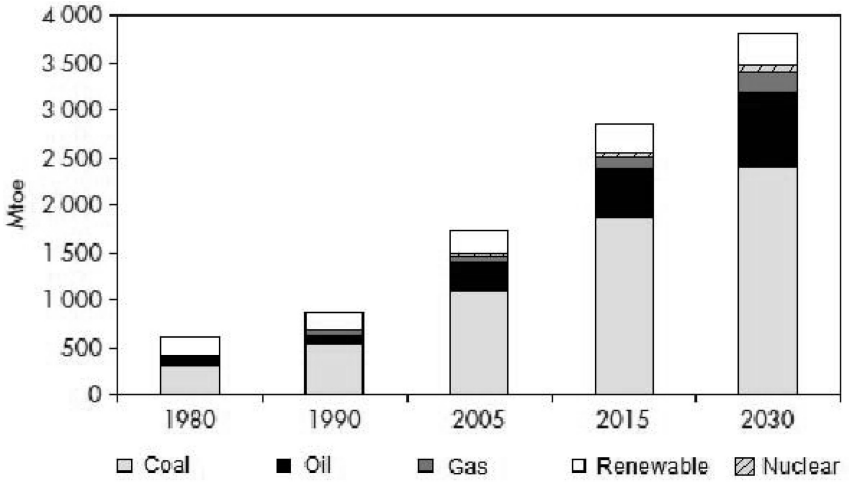
*Carbon intensity is defined as carbon dioxide emitted per unit of GDP (i.e., the ratio of one ton of carbon dioxide to $1,000 of GDP). By this measure, if China's GDP continues to increase rapidly, emissions could still increase, but the rate of increase will slow. According to figures published by the U.S. Department of Energy, China in 2006 emitted 2.85 tons of carbon dioxide from fossil fuels for every $1,000 of GDP. In comparison, the United States in 2006 emitted 0.52 tons of carbon dioxide for every $1,000 of GDP.

tal policies in China. Bureaucratic infighting and a lack of coordination among ministries, commissions, and state-owned companies have led to severe challenges in creating and implementing policies.[61]

Enforcement of clean energy and environmental laws is particularly difficult at the local level. Local authorities often have difficulties accessing the capital necessary to make energy efficiency upgrades, collect accurate data on carbon emissions, and gauge the effectiveness of current policies.[62] It is for this reason that only about 25 percent of China's more than 660 cities are capable of monitoring water quality once a month to check for pollutants.[63] In addition, Stephen Hammer, director of the Joint US–China Cooperation on Clean Energy's Smart Cities Initiative, testified that the performance of local officials is still primarily appraised based on economic output. He stated, "Because local officials are expected to deliver 6 to 8 percent GDP growth each year, and because the 'report cards' used to evaluate local official performance are so heavily skewed toward economic indicators, meaningful progress may take some time."[64]

A final challenge is that China must balance between protecting its environment and developing its economy. China's demand for energy will continue to grow at a rapid rate despite attempts to curb it. The International Energy Agency estimates that total energy demand will increase by more than 25 percent by 2015 and by almost 60 percent by 2030 despite China's clean energy policies. The agency also estimates that coal will still account for 63 percent of China's energy mix by 2030.[65] During the Commission's July 2010 trip to China, a representative from the China Institute for International and Strategic Studies stated that China is still 100 years behind the United States in industrializing. In order to maintain high levels of GDP growth, the country will keep up its large appetite for energy.[66]

Figure 2: China's Primary Energy Demand, 1980–2030



Source: Adapted from International Energy Agency, *World Economic Outlook 2007: China and India Insights* (Paris, France: Organization for Economic Cooperation and Development, 2007), p. 289.

China's Participation in UN Climate Change Negotiations

China is party to a number of UN treaties addressing global environmental concerns. As a party to the United Nations Framework Convention on Climate Change,* the Kyoto Protocol,† and the Copenhagen Accord, China has expressed its commitment to preventing and mitigating climate change and to improving its environmental standards. Although contentious, the identification of China as a developing nation based on the 1992 UN Framework Convention on Climate Change therefore does not require China to make legally binding commitments that an independent body can verify.[67] During the Commission's July trip to China, a representative from China's Ministry of Foreign Affairs reiterated that China is still a developing country and thus has different obligations than developed countries in climate negotiations.

The December 2009 UN Copenhagen Summit was meant to establish targets for a framework for climate change mitigation beyond 2012. Ultimately, many policymakers and environmental experts deemed the summit a failure. Many were disappointed with the failure to achieve a comprehensive agreement at Copenhagen and were dissatisfied with the final Copenhagen Accord. The Copenhagen Accord is a legally nonbinding international agreement seeking to limit the rise in global temperatures by 2 degrees Celsius and noting that developed countries will provide $100 billion of support to developing nations by 2020.[68] Each country that "took note of" the Copenhagen Accord also submitted its own domestic actions to prevent and mitigate the effects of global climate change. China is one of the nations that expressed its support for the accord and submitted its 40–45 percent carbon intensity reduction target to the UN Framework Convention on Climate Change.[69]

Many of those disappointed with the outcome of the Copenhagen Summit blamed China for the failure of the conference and severely criticized China's negotiators for refusing to budge on several core principles, which included the following:

- *Common but differentiated responsibilities*—China maintained that developed countries should take more arduous mitigation actions than developing countries (to include itself), such as providing financial and technological support to help developing nations limit their carbon emissions.
- *Nonbinding international commitments*—China asserted that any domestic targets that developing nations submit (such as China's 40–45 percent carbon intensity target) should not be legally binding.[70]

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*China signed the United Nations Framework Convention on Climate Change in 1992. The objective of the treaty was to limit greenhouse gas emissions in the atmosphere. While the convention did not set mandatory emissions caps for individual countries, it set the foundation for developed countries to establish targets to reduce emissions in future agreements. Under the treaty, China is considered a developing country. The United States is also party to the convention and is considered a developed country.

†China ratified the Kyoto Protocol in 2005. The protocol establishes the concept that developed countries are principally responsible for the current levels of greenhouse gas emissions as a result of more than 150 years of industrial activity. Because of this, the protocol puts a higher burden on developed nations under the principle of "common but differentiated responsibilities." The United States has not ratified the protocol.

Ed Miliband, Britain's lead climate negotiator at Copenhagen, stated that China had "hijacked" the conference by refusing to allow legally binding targets.[71] In testimony to the Commission, Elizabeth Economy, director for Asia Studies at the Council on Foreign Relations, noted that China was relatively obstinate in its approach not because Beijing intentionally wanted to obstruct the conference but because its negotiators had little room to negotiate beyond what was approved by senior leaders in China. She stated, "Everything China was prepared to give [at Copenhagen] was right up front. After that there wasn't going to be much room for real negotiation moving forward . . . What surprised [China] was the extent to which they were blamed for Copenhagen going awry."[72]

The United States and China clashed on a number of issues at Copenhagen. One of the main sources of contention was China's refusal to submit its 40–45 percent carbon intensity reduction target to international verification to ensure that China does not manipulate its data to show higher emissions cuts.[73] After much negotiation, China agreed to make its domestically produced reports publicly available, but only actions that receive international financing or technology would be subject to independent verification.[74] A second disagreement had to do with the provision of financing to developing nations. Early on in the negotiations, the United States stated it would direct funding toward the least developed countries and would not provide funds to help China curb its emissions.[75] The United States eventually agreed to contribute to a $100 billion international fund for developing nations.*[76] However, the offer was contingent on China committing its emissions to a binding agreement and submitting the reductions to transparent verification. By the end of the summit, China agreed to neither precondition.[77]

Despite China's recalcitrance at the Copenhagen Summit, several witnesses testified to the Commission that China's commitments were significant and achieved some long-sought U.S. goals. Mr. Bradley noted that China's submission of its 40–45 percent carbon intensity reduction target to the UN Framework Convention on Climate Change was the first time China had ever submitted a numerical target, albeit voluntary, for lowering its carbon emissions. In addition, Beijing agreed to submit its domestic reports on emissions to the United Nations biannually. He stated, "Not that long ago, many experts would have considered securing even these public commitments unlikely."[78]

*The United States made it clear during the meetings that China would not receive any of the U.S. funding meant for developing nations to mitigate the effects of climate change. China did not completely discount itself as a contender for future funds, but it stated it has never thought of itself as first in line for financing.

China's Role on the International Stage

Another important development at Copenhagen was that China stepped out as a leading player on the international stage. During the summit, China joined together with Brazil, South Africa, and India to form the BASIC group, which purported to be the primary representatives of all developing nations. It was the BASIC group and the United States that drafted the final Copenhagen Accord.[79] Dr. Economy stated:

> *China is in the midst of carving out a new role for itself in global politics . . . and Chinese leadership is uncertain as to whether it should seek to retain its position as a large, successful developing country or assert its role as a global power, with all the rights and responsibilities that entails . . . Copenhagen, in this respect, may have been a watershed event. For many developing countries, climate change has revealed China as less and less 'one of us' and more and more 'one of them.'*[80]

Witnesses viewed China's decision to take a higher-profile role in the climate discussions as being somewhat uncharacteristic. China has agreed to continue to take a lead on climate issues and hosted the last round of talks prior to the next UN Framework Convention on Climate Change summit in Cancun.[81] According to Mr. Bradley, this "signals an increasing willingness to expose itself to both the potential risks and rewards of active international engagement."[82]

U.S.-China Environmental and Clean Energy Cooperation

Environmental protection and clean energy have been noted as one of the main areas for cooperation in the U.S.–China bilateral relationship. Dennis Bracy, chief executive officer of the U.S.-China Clean Energy Forum, testified to the Commission:

> *When it comes to energy, China and the U.S. are in the same boat. And even with the current tensions between our countries, we see no letup in China's willingness to cooperate on clean energy and [energy] efficiency. Understanding our differences, but building on our mutual benefits, we can do more together, more quickly, than we can separately.*[83]

Indeed, the two governments have been cooperating for over 30 years on environmental and energy efficiency initiatives and have signed 45 cooperative agreements.[84] Several areas that experts have noted as important for cooperation between the United States and China in the clean energy field are the following:

- *Capacity-building to measure emissions*—Because the United States has had extensive experience in collecting statistics on carbon dioxide emissions, it is in a position to help China build its capacity to collect reliable environmental and energy data.[85] One example of this type of cooperation is the October 2009 memorandum of cooperation between the U.S. Environmental

Protection Agency and China's National Development and Reform Commission, which helps to develop China's inventory of greenhouse gas emissions.[86]

- *Clean coal*—Both the United States and China have significant domestic coal reserves and rely heavily on coal for their primary energy supply.* Cooperation on improving the efficiency of coal-fired power plants and research and development for carbon capture and storage could have significant impacts on both countries' greenhouse gas emissions.†[87] L. Cartan Sumner, vice president of International Government Relations at Peabody Energy Corp, testified about one such initiative, the $1 billion GreenGen project. It is a joint venture between Chinese utilities and coal companies and St. Louis-based Peabody Energy Corp. designed to build a near-zero emissions coal-fired power plant in Tianjin, China.[88]
- *Smart grid technology*‡—According to the Pew Center on Global Climate Change, "Both the United States and China rely on outdated, decentralized, and inefficient electrical transmission systems. Both countries could profit from research, development, and adoption of new 'smart grid' technologies capable of enabling these systems to handle larger quotients of low-carbon energy from . . . renewable energy sources."[89]
- *Research and development for additional clean technologies*—Both governments have spent significant amounts of money to promote the development of clean technologies. Nevertheless, many of these remain in their nascent stages and are extremely expensive. In July 2009, the United States and China formed the U.S.-China Clean Energy Research Center to facilitate joint research and development on technologies for clean coal, environmentally friendly vehicles, and energy-efficient buildings.[90] According to Assistant Secretary of Energy Sandalow, "The United States and China have complementary strengths in these areas, so each country will benefit from collaborative research."[91] In March 2010, the U.S. Department of Energy announced that the United States would provide $75 million in public and private funding for the research center. China will provide an additional $75 million.[92]

(For a list of major U.S.-China clean energy cooperation deals since 2008, please see the appendix at the end of this section.)

While many agree that cooperation on climate and energy issues is important for both countries, some experts have expressed concern over the possible negative implications of cooperation. One area of concern is intellectual property protection. American com-

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*China relies on coal for over 70 percent of its total energy use. The United States relies on coal for almost 30 percent of total energy use.

†Carbon capture and storage is the process used to capture carbon dioxide from power plants or industrial facilities, compress it, and then transport it to suitable locations in order to inject it into subsurface geological formations. This prevents the carbon dioxide from escaping into the atmosphere.

‡Smart grids differ from traditional electric grids in that they allow users to monitor and control grid activities. This allows the two-way flow of electricity and information between power plants and consumers and can dramatically increase energy efficiency. They also enhance the ability to connect renewable energy sources to main power grids.

panies are often reluctant to invest in clean technology in China because of China's lax intellectual property protection. According to Albert Tramposch, deputy executive director of the American Intellectual Property Law Association, "[I] am not aware of any major initiatives that are coming out of the Chinese government . . . that relate to ways to facilitate the patent protection of green technology."[93] Another concern among some U.S. business people and policymakers is that China could reap the benefits of cooperation at the expense of U.S. industry. They further argue that any U.S. money going to cooperation on clean energy is disenfranchising the domestic clean energy sector in the United States, which already is falling behind Chinese clean energy manufacturers.[94] For example, when several U.S. senators learned that U.S. stimulus money would go toward a Texas wind farm whose turbines would be manufactured in China, Senator Sherrod Brown (D–OH) stated: "We cannot sit idly by while China races to the forefront of clean energy production at the expense of U.S. manufacturing, U.S. jobs, and U.S. energy independence. And we certainly can't shoot ourselves in the foot by helping to finance Chinese clean energy production."[95] (For more information on the competition between U.S. and Chinese renewable energy companies, see chap. 4, sec. 2, of this Report.) Finally, several analysts criticize U.S.-China cooperation because of its history of ineffectiveness. Many of the impediments that prevent China from enacting sweeping clean energy legislation domestically, such as low implementation at the local level and lack of transparency, also inhibit broader cooperation with the United States. In addition, the United States has often signed cooperative agreements without having a dedicated source of funding for the endeavors.[96] Dr. Economy stated:

> *Chinese energy and environmental agencies are woefully understaffed and often unable to meet the demands of in-depth cooperation. . . . There is also a very real danger that U.S. officials will raise expectations within China but fail to deliver if, for example, the U.S. government does not provide adequate funding . . . as has happened with past cooperative energy and environmental ventures.*[97]

Implications for the United States

To the extent that China's green energy and environmental policies lead to reductions in carbon dioxide emissions and harmful pollutants that are internationally threatening, these policies are positive for the United States. As China increases its capacity to curb pollution and energy intensity, it also may be able to increase mutually beneficial cooperation with the United States on clean energy. This cooperation could serve to reduce clean energy costs for both countries and to respond to the effects of global climate change. However, as the Chinese government supports its domestic clean energy sector, the United States must be wary of protectionist measures that disadvantage U.S. companies both in China and in the international market. (For more information on China's protectionist measures to promote domestic wind, solar, and electric vehicles sectors, please see chap. 4, sec. 2, of this Report.)

The fact that China still characterizes itself (and is considered by the United Nations to be) a developing nation could also have numerous implications for the United States. According to the 1992 UN Framework Convention on Climate Change, as a developing nation, China has no legally binding responsibilities under international climate agreements. Dr. Economy testified that China "will continue to use [its] developing country status as a protective shield against further pressure [to increase its international climate commitments]."[98] In addition, because of its developing nation status, China is eligible to receive funding from developed countries, such as the United States. At Copenhagen, China announced that it did not consider itself first in line for funding but did not discount itself as a contender for future funds.[99] Depending on the results of the November/December 2010 climate summit in Cancun, this could mean that the United States would be contributing to a pool of funds that could be supporting China's domestic clean energy sector.

Conclusions

- China has devoted a significant amount of money and has developed legislation in an effort to find alternative sources for energy, improve energy efficiency, protect the environment in the country, and build sectors of its economy.
- Despite progress in reducing pollutants and increasing green energy over the short term, significant problems such as lack of compliance at the local level and China's economic development plans may make it harder to sustain this progress over the long term.
- China's domestic legislation on green energy has been more substantive than its commitments in international climate change negotiations. Despite the fact that China believes it is in its domestic interest to curb energy inefficiency and carbon emissions, Beijing is reluctant to be held accountable for reductions on the international stage.
- The United States and China share many similar challenges in their quest for green energy and could have much to gain from cooperation on these issues.